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Joes Valley Reservoir
Emery County, Utah

National Eutrophication Survey, Corvallis, Oreg

Prepared for

Corvallis Environmental Research Lab, Oreg

Oct 77

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U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY

WORKING PAPER SERIES

REPORT

ON

JOES VALLEY RESERVOIR

EMERY COUNTY

UTAH

EPA REGION VIII

WORKING PAPER No. 841

CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY - CORVALLIS, OREGON

and

ENVIRONMENTAL MONITORING & SUPPORT LABORATORY - LAS VEGAS, NEVADA

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REPORT

ON

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EMERY COUNTY

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EPA REGION VIII

WORKING PAPER No. 841

WITH THE COOPERATION OF THE

UTAH STATE DIVISION OF HEALTH

AND THE

UTAH NATIONAL GUARD

OCTOBER, 1977

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16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

17. KEY WORDS AND DOCUMENT ANALYSIS

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGEMENT

The staff of the National Eutrophication Survey (Office of Research and Development, U.S. Environmental Protection Agency) expresses sincere appreciation to the Utah Department of Social Services and the Utah Department of Natural Resources for professional involvement, to the Utah National Guard for conducting the tributary sampling phase of the Survey, and to those Utah wastewater treatment plant operators who voluntarily provided effluent samples and flow data.

The staffs of the Bureau of Water Quality of the Division of Health and the Division of Wildlife Resources provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

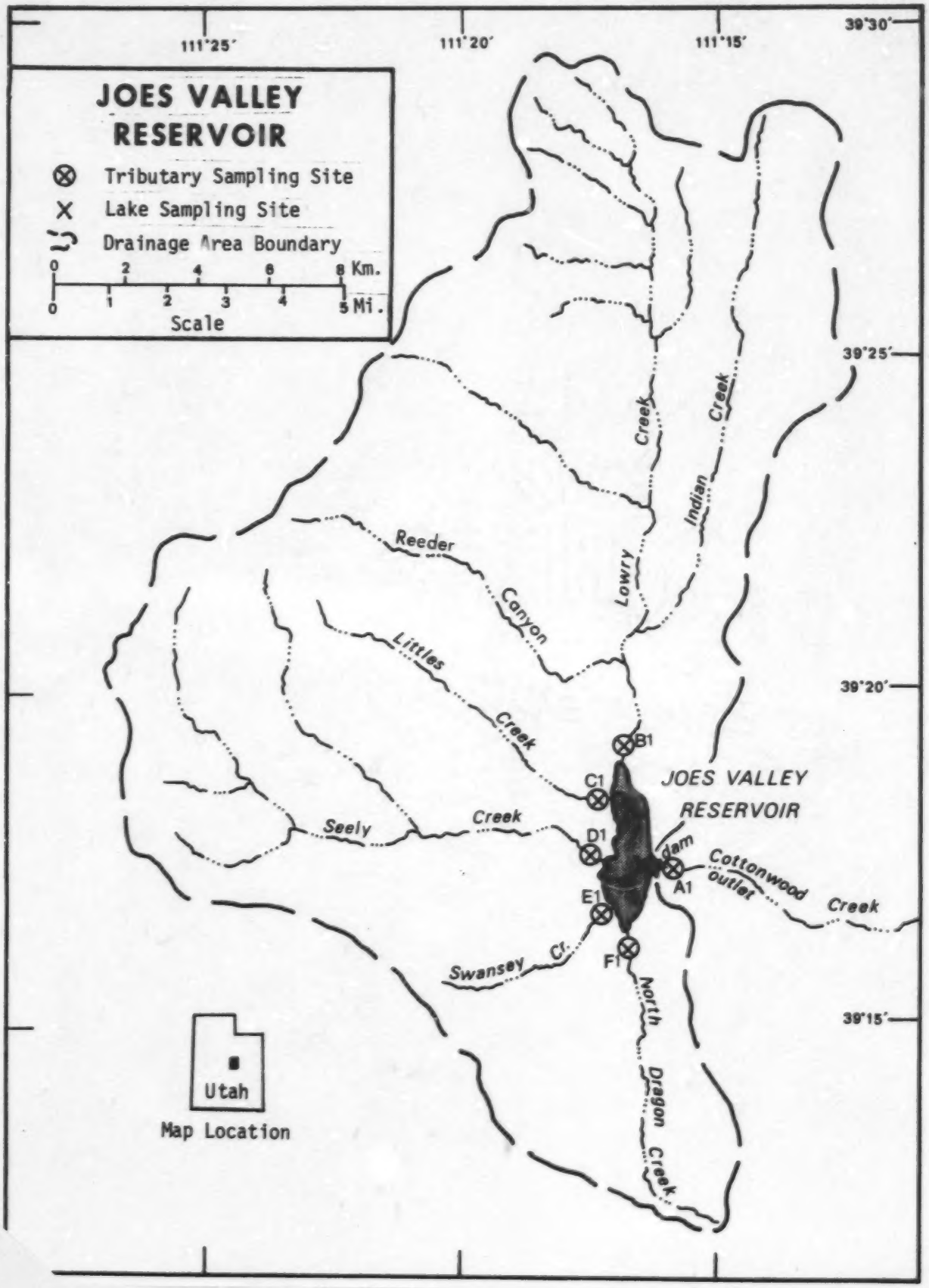
Major General Maurice L. Watts, the Adjutant General of Utah, and Project Officer Lt. Colonel T. Ray Kingston, who directed the volunteer efforts of the Utah National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES AND RESERVOIRS

STATE OF UTAH

NAME	COUNTY
Bear	Rich, UT; Bear Lake, ID
Deer Creek	Wasatch
Echo	Summit
Fish	Sevier
Flaming Gorge	Daggett, UT; Sweetwater, WY
Huntington	Emery
Joes Valley	Emery
Lower Bowns	Garfield
Lynn	Box Elder
Minersville	Beaver
Moon	Duchesne
Navajo	Kane
Newcastle	Iron
Otter Creek	Piute
Panguich	Garfield
Pelican	Uintah
Pineview	Weber
Piute	Piute
Porcupine	Cache
Powell	Garfield, Kane, San Juan, UT; Coconino, AZ
Pruess	Millard
Sevier Bridge	Juab, Sanpete
Starvation	Duchesne
Steinaker	Uintah
Tropic	Garfield
Utah	Utah
Willard Bay	Box Elder


JOES VALLEY RESERVOIR
Tributary Sampling Site
Lake Sampling Site
Drainage Area Boundary
0 2 4 6 8 Km.
0 1 2 3 4 5 Mi.
Scale
111°25′
111°20′
111°15′
39°30′
39°25′
39°20′
39°15′
Reeder Canyon
Lowry Creek
Indian Creek
Littles Creek
Seely Creek
Swansey Cr.
North Dragon Creek
Cottonwood Creek
JOES VALLEY RESERVOIR
dam
outlet
A1
B1
C1
D1
E1
F1
Utah
Map Location

JOES VALLEY RESERVOIR

STORET NO. 4908

I. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that Joes Valley Reservoir is mesotrophic. It ranked sixth in overall trophic quality when the 27 Utah lakes and reservoirs sampled in 1975 were compared using a combination of six parameters*. Five of the water bodies had less median total phosphorus, one had less and three had the same median dissolved orthophosphorus, 11 had less median inorganic nitrogen, four had less mean chlorophyll a, and ten had greater mean Secchi disc transparency. Depression of dissolved oxygen with depth occurred at sampling station 1 in September (3.8 mg/l at 36.6 meters).

Survey limnologists noted some surface concentrations of algae in August.

B. Rate-Limiting Nutrient:

The algal assay results indicate the reservoir was phosphorus limited in September. The reservoir data indicate nitrogen limitation in May and phosphorus limitation in August and September.

C. Nutrient Controllability:

1. Point sources--No known point sources impacted Joes Valley Reservoir during the sampling year.

2. Non-point sources--Non-point sources contributed the entire

* See Appendix A.

phosphorus loading to the reservoir during the sampling year. Lowry Creek contributed 45.9% of the total, Seely Creek contributed 29.6%, and Littles Creek added 13.2%. The ungaged minor tributaries and immediate drainage contributed an estimated 3.4%.

The estimated phosphorus loading of 0.70 g/m^2/year is less than that proposed by Vollenweider (Vollenweider and Dillon, 1974) as a eutrophic loading but is more than his suggested oligotrophic loading (i.e., a mesotrophic loading; see page 11). Therefore, management of the reservoir should be directed toward prevention of any increase in the loading.

II. RESERVOIR AND DRAINAGE BASIN CHARACTERISTICS†

A. Morphometry††:

1. Surface area: 4.74 kilometers^2.
2. Mean depth: 16.3 meters.
3. Maximum depth: 37.5 meters.
4. Volume: 77.093 x 10^6 m^3.
5. Mean hydraulic retention time: 316 days.

B. Tributary and Outlet:
(See Appendix C for flow data)

1. Tributaries -

Name	Drainage area (km^2)*	Mean flow (m^3/sec)*
Lowry Creek	186.5	1.470
Littles Creek	16.6	0.113
Seely Creek	93.2	1.200
Swansey Creek	16.3	0.023
North Dragon Creek	38.8	0.002
Minor tributaries & immediate drainage -	22.0	0.030
Totals	373.4	2.838

2. Outlet -

Cottonwood Creek	378.1**	2.820

C. Precipitation***:

1. Year of sampling: 24.7 centimeters.
2. Mean annual: 26.2 centimeters.

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† Table of metric conversions--Appendix B.
†† Sudweeks, 1975.
* For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".
** Includes area of reservoir.
*** See Working Paper No. 175.

III. WATER QUALITY SUMMARY

Joes Valley Reservoir was sampled three times during the open-water season of 1975 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from a number of depths at two stations on the reservoir (see map, page v). During each visit, a single depth-integrated (4.6 m to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the last visit, a single 18.9-liter depth-integrated sample was composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 36.9 meters at station 1 and 12.5 meters at station 2.

The sampling results are presented in full in Appendix D and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR JOE'S VALLEY RESERVOIR
STORET CODE 4908

PARAMETER	1ST SAMPLING (5/13/75) 2 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (8/12/75) 2 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (9/24/75) 2 SITES RANGE	MEAN	MEDIAN
TEMP (C)	4.8 - 25.4	11.9	10.3	7.6 - 19.0	14.8	17.7	11.6 - 17.0	15.3	16.6
DISS OXY (MG/L)	9.2 - 9.6	9.3	9.4	6.0 - 8.2	7.4	7.8	3.8 - 8.2	6.5	7.2
CNDCTVY (MCROMO)	241. - 270.	256.	257.	272. - 347.	320.	338.	239. - 295.	269.	274.
PH (STAND UNITS)	8.4 - 8.5	8.5	8.5	8.0 - 8.5	8.3	8.3	8.2 - 8.6	8.4	8.5
TOT ALK (MG/L)	201. - 202.	201.	201.	179. - 195.	184.	181.	190. - 202.	195.	194.
TOT P (MG/L)	0.011 - 0.015	0.013	0.012	0.010 - 0.037	0.016	0.013	0.007 - 0.018	0.010	0.009
ORTHO P (MG/L)	0.003 - 0.014	0.011	0.011	0.002 - 0.005	0.003	0.003	0.002 - 0.007	0.003	0.003
NO2+NO3 (MG/L)	0.020 - 0.040	0.023	0.020	0.020 - 0.240	0.111	0.120	0.020 - 0.240	0.116	0.100
AMMONIA (MG/L)	0.020 - 0.030	0.021	0.020	0.020 - 0.050	0.026	0.020	0.020 - 0.020	0.020	0.020
KJEL N (MG/L)	0.200 - 0.300	0.220	0.200	0.200 - 0.500	0.373	0.400	0.400 - 1.200	0.709	0.600
INORG N (MG/L)	0.040 - 0.060	0.044	0.040	0.040 - 0.260	0.137	0.170	0.040 - 0.260	0.136	0.120
TOTAL N (MG/L)	0.220 - 0.320	0.243	0.220	0.320 - 0.720	0.484	0.420	0.600 - 1.220	0.825	0.840
CHLRPYL A (UG/L)	2.0 - 2.1	2.0	2.0	3.2 - 4.4	3.8	3.8	1.6 - 1.6	1.6	1.6
SECCHI (METERS)	1.8 - 1.8	1.8	1.8	2.4 - 2.4	2.4	2.4	3.0 - 3.7	3.4	3.4

B. Biological Characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
05/13/75	1. Flagellates	1,354
	2. Microcystis sp.	1,113
	3. Chroomonas (?) sp.	242
	4. Carteria sp.	48
	5. Cryptomonas sp.	48
	Total	2,805
08/12/75	1. Cyclotella sp.	1,976
	2. Dinobryon sp.	476
	3. Chroomonas (?) sp.	256
	4. Microcystis sp.	110
	5. Cryptomonas sp.	73
	Other genera	74
	Total	2,965
09/24/75	1. Microcystis sp.	610
	2. Fragilaria sp.	326
	3. Dinobryon sp.	163
	4. Cryptomonas sp.	41
	Other genera	39
	Total	1,179

2. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (µg/l)
05/13/75	1	2.1
	2	2.0
08/12/75	1	4.4
	2	3.2
09/24/75	1	1.6
	2	1.6

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.005	0.140	0.2
0.050 P	0.055	0.140	5.3
0.050 P + 1.0 N	0.055	1.140	16.2
1.0 N	0.005	1.140	0.1

2. Discussion -

The control yield of the assay alga, Selenastrum capricornutum, indicates that the potential primary productivity of the reservoir was moderately low at the time the sample was collected (09/24/75). Also, the increased yield resulting from the addition of phosphorus alone indicates that the reservoir was phosphorus limited at that time. Note that the addition of nitrogen alone did not result in an increased yield.

The reservoir data indicate nitrogen limitation in May and phosphorus limitation in August and September (the mean inorganic nitrogen/orthophosphorus ratios were 4/1, 46/1, and 45/1, respectively).

IV. NUTRIENT LOADINGS
(See Appendix E for data)

For the determination of nutrient loadings, the Utah National Guard collected monthly near-surface grab samples when possible from each of the tributary sites indicated on the map (page v), except for the high runoff month of May when two samples were collected at three of the sites. Sampling was begun in November, 1974, and was completed in September, 1975.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Utah District Office of the U.S. Geological Survey for the tributary sites nearest the reservoir.

In this report, nutrient loads for sampled tributaries were calculated using mean annual concentrations and mean annual flows. Nutrient loads for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the mean concentrations in Littles Creek at station C-1 and the mean annual ZZ flow.

No known wastewater treatment plants impacted the reservoir during the sampling year.

A. Waste Sources:

1. Known municipal - None
2. Known industrial - None

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/yr	% of total
a. Tributaries (non-point load) -		
Lowry Creek	1,530	45.9
Littles Creek	440	13.2
Seely Creek	985	29.6
Swansey Creek	165	4.9
North Dragon Creek	15	0.5
b. Minor tributaries & immediate drainage (non-point load) -	115	3.4
c. Known municipal STP's - None	-	-
d. Septic tanks - Unknown	?	-
e. Known industrial - None	-	-
f. Direct precipitation* -	85	2.5
Total	3,335	100.0

2. Outputs -

Reservoir outlet - Cottonwood Creek 2,310

3. Net annual P accumulation - 1,025 kg.

* See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/yr	% of total
a. Tributaries (non-point load) -		
Lowry Creek	30,085	36.2
Littles Creek	3,125	3.8
Seely Creek	42,840	51.6
Swansey Creek	885	1.1
North Dragon Creek	115	0.1
b. Minor tributaries & immediate drainage (non-point load) -	830	1.0
c. Known municipal STP's - None	-	-
d. Septic tanks - Unknown	?	-
e. Known industrial - None	-	-
f. Direct precipitation* -	5,115	6.2
Total	82,995	100.0

2. Outputs -

Reservoir outlet - Cottonwood Creek	87,240

3. Net annual N loss - 4,245 kg.

D. Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km²/yr	kg N/km²/yr
Lowry Creek	8	161
Littles Creek	27	188
Seely Creek	11	460
Swansey Creek	10	54
North Dragon Creek	<1	3

* See Working Paper No. 175.

E. Yearly Loads:

In the following table, the existing phosphorus loadings are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Essentially, his "dangerous" loading is one at which the receiving water would become eutrophic or remain eutrophic; his "permissible" loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic loading would be considered one between "dangerous" and "permissible".

Note that Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m^2/yr	0.70	0.22	17.5	loss*

Vollenweider phosphorus loadings ($g/m^2/yr$) based on mean depth and mean hydraulic retention time of Joes Valley Reservoir:

"Dangerous" (eutrophic loading)	0.84
"Permissible" (oligotrophic loading)	0.42

* There was an apparent loss of nitrogen during the sampling year. This may have been due to nitrogen fixation in the reservoir, solubilization of previously sedimented nitrogen, recharge with nitrogen-rich ground water, unsampled point sources discharging directly to the reservoir, or insufficient outlet sampling. Whatever the cause, a similar nitrogen loss has occurred at Shagawa Lake, Minnesota, which has been intensively studied by EPA's former National Eutrophication and Lake Restoration Branch (Malueg et al., 1975).

V. LITERATURE REVIEWED

Malueg, Kenneth W., D. Phillips Larsen, Donald W. Schults, and Howard T. Mercier; 1975. A six-year water, phosphorus, and nitrogen budget for Shagawa Lake, Minnesota. Jour. Environ. Qual., vol. 4, no. 2, pp. 236-242.

Sudweeks, Calvin K., 1975. Personal communication (reservoir morphometry). UT Bur. of Env. Health, Salt Lake City.

Vollenweider, R. A., and P. J. Dillon, 1974. The application of the phosphorus loading concept to eutrophication research. Natl. Res. Council of Canada Publ. No. 13690, Canada Centre for Inland Waters, Burlington, Ontario.

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN RANKINGS

CODE LAKE	LAKE NAME	POINT % MEDIAN	INDEX % MEDIAN	MEAN SEC 200-	CHLORA MEAN	MIN DO 12-	DISS OXYGEN % MEDIAN
#001	BEAR LAKE	0.010	0.010	330.030	3.001	13.000	0.001
#002	LAKE BARRETT	0.011	0.040	525.191	0.042	6.500	0.003
#003	DEER CREEK RESERVOIR	0.031	0.040	360.000	5.201	6.000	0.000
#005	TOWER ROAD#2 RESERVOIR	0.030	0.312	430.333	8.018	10.000	0.000
#006	ECHO RESERVOIR	0.001	0.110	420.333	9.041	14.000	0.015
#008	CLAM RESERVOIR	0.151	0.500	411.881	33.000	10.400	0.025
#009	LITTLE LAKE	0.053	0.040	125.000	15.283	10.400	0.004
#010	MORRISON HOLLOW RESERVOIR	0.012	0.040	305.000	1.000	1.000	0.002
#012	TOBIAS VALLEY RESERVOIR	0.215	0.040	406.000	5.283	11.500	0.003
#013	MINERSVILLE RESERVOIR	0.185	0.000	402.000	33.283	8.000	0.101
#014	MOON LAKE	0.038	0.040	387.000	5.100	6.000	0.005
#015	HYATTO LAKE	0.010	0.040	308.000	6.000	9.000	0.003
#016	MENDENSITE RESERVOIR	0.021	0.040	458.001	15.403	13.000	0.000
#017	BITCH CREEK RESERVOIR	0.101	0.040	423.001	11.101	10.000	0.033
#018	SANDWICH LAKE	0.017	0.040	450.000	42.020	15.500	0.010
#019	AMERICAN LAKE	0.040	0.020	430.000	0.320	8.000	0.004
#020	WINDSLEY RESERVOIR	0.058	0.300	420.003	2.035	14.000	0.000
#021	STATE RESERVOIR	0.041	0.120	405.052	52.350	11.000	0.001
#022	GORDONLINE RESERVOIR	0.052	0.110	440.000	1.080	15.000	0.011
#023	BROSS RESERVOIR (LOWER)	0.021	0.100	401.003	4.233	8.000	0.008
#024	STATES RIDGE RESERVOIR	0.050	0.322	470.110	10.555	15.000	0.009
#025	SILVERATION RESERVOIR	0.014	0.040	304.203	2.812	13.500	0.004
#026	STEINMAKER RESERVOIR	0.013	0.040	310.120	1.844	15.000	0.002
#027	ATHENIC RESERVOIR	0.151	0.020	452.000	1.500	8.000	0.000
#028	NIPP LAKE	0.135	0.350	460.203	15.015	11.000	0.015
#029	ALLEGHENY BAY RESERVOIR	0.040	0.000	423.185	1.261	11.000	0.000
#032	LAURELWOOD RESERVOIR	0.011	0.080	500.030	5.200	10.400	0.003

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
0408	LAKE POWELL	0.010	0.410	339.830	3.081	13.800	0.007
4901	BEAR LAKE	0.011	0.040	253.167	0.945	9.200	0.003
4902	LOWER BOWN'S RESERVOIR	0.031	0.040	336.000	5.567	9.400	0.006
4903	DEER CREEK RESERVOIR	0.038	0.215	430.333	9.078	14.800	0.006
4904	ECHO RESERVOIR	0.047	0.170	450.333	6.967	14.000	0.012
4905	LYNN RESERVOIR	0.121	0.200	417.667	39.600	10.400	0.052
4906	FISH LAKE	0.023	0.040	152.000	12.483	10.400	0.004
4907	HUNTINGTON NORTH RESERVO	0.013	0.040	392.000	1.900	7.800	0.005
4908	JOE'S VALLEY RESERVOIR	0.012	0.045	400.000	2.483	11.200	0.003
4909	MINERSVILLE RESERVOIR	0.192	0.060	445.000	33.583	8.600	0.107
4910	MOON LAKE	0.008	0.040	381.000	2.700	9.600	0.002
4911	NAVAJO LAKE	0.016	0.040	368.000	2.000	6.000	0.003
4912	NEWCASTLE RESERVOIR	0.051	0.040	428.667	12.467	13.600	0.009
4913	OTTER CREEK RESERVOIR	0.067	0.040	453.667	11.767	10.600	0.033
4914	PANQUITCH LAKE	0.071	0.040	426.500	45.950	14.200	0.010
4915	PELICAN LAKE	0.044	0.050	438.500	6.350	8.400	0.004
4916	PINEVIEW RESERVOIR	0.028	0.300	435.083	5.692	14.600	0.006
4917	PIUTE RESERVOIR	0.047	0.150	482.625	25.329	11.600	0.007
4918	PORCUPINE RESERVOIR	0.025	0.110	440.000	7.860	12.400	0.011
4919	PRUESS RESERVOIR (GARRIS	0.057	0.140	491.000	4.533	8.800	0.008
4920	SEVIER BRIDGE RESERVOIR	0.026	0.355	449.778	18.222	12.400	0.008
4921	STARVATION RESERVOIR	0.016	0.040	394.583	5.675	13.200	0.004
4922	STEINAKER RESERVOIR	0.011	0.040	316.750	1.844	12.600	0.005
4923	TROPIC RESERVOIR	0.021	0.050	425.000	7.200	8.400	0.006
4924	UTAH LAKE	0.132	0.320	490.583	72.012	11.400	0.012
4925	WILLARD BAY RESERVOIR	0.044	0.060	457.182	7.567	11.000	0.009
5605	FLAMING GORGE RESERVOIR	0.011	0.690	285.636	2.500	10.400	0.003

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
0408	LAKE POWELL	96 (25)	4 (1)	81 (21)	73 (19)	15 (4)	42 (11)	311
4901	BEAR LAKE	90 (23)	87 (19)	96 (25)	100 (26)	77 (20)	90 (23)	540
4902	LOWER BOWN'S RESERVOIR	46 (12)	87 (19)	85 (22)	65 (17)	73 (19)	50 (13)	406
4903	DEER CREEK RESERVOIR	42 (11)	19 (5)	42 (11)	35 (9)	0 (0)	58 (14)	196
4904	ECHO RESERVOIR	31 (8)	27 (7)	19 (5)	50 (13)	12 (3)	13 (3)	152
4905	LYNN RESERVOIR	8 (2)	23 (6)	58 (15)	8 (2)	62 (15)	4 (1)	163
4906	FISH LAKE	62 (16)	65 (16)	100 (26)	23 (6)	62 (15)	79 (20)	391
4907	HUNTINGTON NORTH RESERVO'	77 (20)	65 (16)	69 (18)	92 (24)	96 (25)	69 (18)	468
4908	JOE'S VALLEY RESERVOIR	81 (21)	58 (15)	62 (16)	85 (22)	46 (12)	96 (25)	428
4909	MINERSVILLE RESERVOIR	0 (0)	44 (11)	27 (7)	12 (3)	85 (22)	0 (0)	168
4910	MOON LAKE	100 (26)	87 (19)	73 (19)	77 (20)	69 (18)	100 (26)	506
4911	NAVAJO LAKE	69 (18)	87 (19)	77 (20)	88 (23)	100 (26)	85 (22)	506
4912	NEWCASTLE RESERVOIR	23 (6)	87 (19)	46 (12)	27 (7)	19 (5)	27 (7)	229
4913	OTTER CREEK RESERVOIR	15 (4)	87 (19)	15 (4)	31 (8)	54 (14)	8 (2)	210
4914	PANGUITCH LAKE	12 (3)	65 (16)	50 (13)	4 (1)	8 (2)	23 (6)	162
4915	PELICAN LAKE	37 (9)	54 (14)	35 (9)	54 (14)	90 (23)	73 (19)	343
4916	PINEVIEW RESERVOIR	50 (13)	15 (4)	38 (10)	58 (15)	4 (1)	58 (14)	223
4917	PIUTE RESERVOIR	27 (7)	31 (8)	8 (2)	15 (4)	38 (10)	46 (12)	165
4918	PORCUPINE RESERVOIR	58 (15)	38 (10)	31 (8)	38 (10)	33 (8)	19 (5)	217
4919	PRUESS RESERVOIR (GARRIS	19 (5)	35 (9)	0 (0)	69 (18)	81 (21)	37 (9)	241
4920	SEVIER BRIDGE RESERVOIR	54 (14)	8 (2)	23 (6)	19 (5)	33 (8)	37 (9)	174
4921	STARVATION RESERVOIR	73 (19)	87 (19)	65 (17)	62 (16)	23 (6)	79 (20)	389
4922	STEINAKER RESERVOIR	85 (22)	87 (19)	88 (23)	96 (25)	27 (7)	65 (17)	448
4923	TROPIC RESERVOIR	65 (17)	50 (13)	54 (14)	46 (12)	90 (23)	58 (14)	363
4924	UTAH LAKE	4 (1)	12 (3)	4 (1)	0 (0)	42 (11)	13 (3)	75
4925	WILLARD BAY RESERVOIR	37 (9)	44 (11)	12 (3)	42 (11)	50 (13)	31 (8)	216
5605	FLAMING GORGE RESERVOIR	90 (23)	0 (0)	92 (24)	81 (21)	62 (15)	90 (23)	415

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	4901	BEAR LAKE	540
2	4911	NAVAJO LAKE	506
3	4910	MOON LAKE	506
4	4907	HUNTINGTON NORTH RESERVO	468
5	4922	STEINAKER RESERVOIR	448
6	4908	JOE'S VALLEY RESERVOIR	428
7	5605	FLAMING GORGE RESERVOIR	415
8	4902	LOWER BOWN'S RESERVOIR	406
9	4906	FISH LAKE	391
10	4921	STARVATION RESERVOIR	389
11	4923	TROPIC RESERVOIR	363
12	4915	PELICAN LAKE	343
13	0408	LAKE POWELL	311
14	4919	PRUESS RESERVOIR (GARRIS	241
15	4912	NEWCASTLE RESERVOIR	229
16	4916	PINEVIEW RESERVOIR	223
17	4918	PORCUPINE RESERVOIR	217
18	4925	WILLARD BAY RESERVOIR	216
19	4913	OTTER CREEK RESERVOIR	210
20	4903	DEER CREEK RESERVOIR	196
21	4920	SEVIER BRIDGE RESERVOIR	174
22	4909	MINERSVILLE RESERVOIR	168
23	4917	PIUTE RESERVOIR	165
24	4905	LYNN RESERVOIR	163
25	4914	PANQUITCH LAKE	162
26	4904	ECHO RESERVOIR	152
27	4924	UTAH LAKE	75

APPENDIX B

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR UTAH 10/18/76

LAKE CODE 4908 JOE'S VALLEY RES.

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 378.1

NORMALIZED FLOWS(CMS)

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
4908A1	378.1	0.42	0.42	0.42	1.05	4.53	8.50	5.66	5.66	3.40	2.80	0.42	0.42	2.82
4908B1	186.5	0.20	0.23	0.31	1.02	4.81	6.51	2.12	0.96	0.57	0.40	0.28	0.23	1.47
4908C1	16.6	0.014	0.017	0.023	0.085	0.368	0.481	0.170	0.085	0.042	0.028	0.023	0.017	0.113
4908D1	93.2	0.14	0.20	0.23	0.79	3.96	5.38	1.70	0.76	0.45	0.31	0.23	0.17	1.20
4908E1	16.3	0.0	0.0	0.006	0.017	0.085	0.113	0.028	0.014	0.008	0.006	0.0	0.0	0.023
4908F1	38.8	0.0	0.0	0.0	0.003	0.008	0.011	0.003	0.003	0.0	0.0	0.0	0.0	0.002
4908ZZ	25.9	0.0	0.0	0.008	0.023	0.113	0.142	0.028	0.020	0.011	0.008	0.0	0.0	0.030

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 378.1
SUM OF SUB-DRAINAGE AREAS = 377.4

TOTAL FLOW IN = 33.98
TOTAL FLOW OUT = 33.73

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4908A1	11	74	0.340	9	0.283				
	12	74	0.368	18	0.340				
	1	75	0.283	12	0.283				
	2	75	0.283	8	0.283				
	3	75	0.283	8	0.283				
	4	75	0.283	5	0.283				
	5	75	4.248	3	1.501	17	5.663		
	6	75	9.061	8	4.814				
	7	75	12.743	1	21.804				
	8	75	4.814	16	5.097				
	9	75	3.115	27	2.832				
	10	75	2.775						
4908B1	11	74	0.255	9	0.311				
	12	74	0.227	18	0.227				
	1	75	0.198	11	0.198				
	2	75	0.170	8	0.198				
	3	75	0.227	8	0.198				
	4	75	0.368	5	0.227				
	5	75	3.115	3	0.368	17	3.681		
	6	75	9.628	8	14.158				
	7	75	7.362	1	14.442				
	8	75	0.708	16	0.708				
	9	75	0.651	27	0.481				
	10	75	0.368						

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TRIBUTARY FLOW INFORMATION FOR UTAH 10/18/76

LAKE CODE 4908 JOE'S VALLEY RES.

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4908C1	11	74	0.008	9	0.017				
	12	74	0.0	18	0.0				
	1	75	0.0	11	0.0				
	2	75	0.0	8	0.0				
	3	75	0.0	8	0.0				
	4	75	0.011	5	0.0				
	5	75	0.198	3	0.028	17	0.198		
	6	75	0.906	8	1.359				
	7	75	0.538	1	0.793				
	8	75	0.057	16	0.057				
	9	75	0.014	27	0.011				
	10	75	0.008						
4908D1	11	74	0.538	9	0.680				
	12	74	0.255	18	0.283				
	1	75	0.227	11	0.255				
	2	75	0.255	8	0.283				
	3	75	0.368	8	0.311				
	4	75	0.595	5	0.510				
	5	75	2.832	3	0.793	17	4.248		
	6	75	8.495	8	10.760				
	7	75	3.398	1	6.230				
	8	75	0.934	16	0.878				
	9	75	0.340	27	0.255				
	10	75	0.198						
4908E1	11	74	0.0	9	0.0				
	12	74	0.0	18	0.0				
	1	75	0.0	11	0.0				
	2	75	0.0	8	0.0				
	3	75	0.0	8	0.0				
	4	75	0.003	5	0.003				
	5	75	0.057	3	0.006	17	0.071		
	6	75	0.255	8	0.368				
	7	75	0.042	1	0.071				
	8	75	0.008	16	0.008				
	9	75	0.0	27	0.0				
	10	75	0.0						
4908F1	11	74	0.0						
	1	75	0.0						
	2	75	0.0						
	3	75	0.0						
	4	75	0.0						
	5	75	0.006						
	6	75	0.011						
	7	75	0.011						
	8	75	0.006						
	9	75	0.0						
	10	75	0.0						

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TRIBUTARY FLOW INFORMATION FOR UTAH 10/18/76

LAKE CODE 4908 JOE'S VALLEY RES.

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4908ZZ	11	74	0.0						
	12	74	0.0						
	1	75	0.0						
	2	75	0.0						
	3	75	0.0						
	4	75	0.003						
	5	75	0.085						
	6	75	0.340						
	7	75	0.057						
	8	75	0.011						
	9	75	0.0						
	10	75	0.0						

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APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 76/08/12

490801
39 17 20.0 111 16 15.0 3
JOE'S VALLEY RESERVOIR
49015 UTAH
110691

11EPALES 2111202
0098 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/05/13	14 20	0000	7.1	9.2	72	259	8.50	202	0.030	0.300	0.020	0.014
	14 20	0005		9.4		259	8.50	201	0.020	0.200	0.020	0.011
	14 20	0015		9.4		251	8.40	201	0.020	0.200	0.020	0.003
	14 20	0040		9.2		248	8.40	201	0.020	0.200	0.020	0.011
	14 20	0065		9.2		241	8.40	201	0.020	0.200	0.030	0.011
	14 20	0094	4.8	9.2		244	8.40	202	0.020	0.200	0.040	0.012
75/08/12	12 00	0000	18.4	8.0	96	344	8.05	179	0.020K	0.400	0.020K	0.003
	12 00	0005	18.1	7.8		338	8.45	181	0.020K	0.300	0.020K	0.002K
	12 00	0015	17.7	8.2		333	8.50	179	0.020K	0.400	0.020K	0.002
	12 00	0030	10.6	6.6		288	8.20	183	0.030	0.400	0.160	0.003
	12 00	0060	8.0	6.0		272	8.20	188	0.030	0.400	0.230	0.003
	12 00	0121	7.6	6.0		283	8.20	190	0.020K	0.400	0.240	0.003
75/09/24	10 15	0000	16.6	7.8	144	295	8.60	190	0.020K	1.000	0.020K	0.002
	10 15	0005	16.6	7.2			8.60	191	0.020K	1.200	0.020K	0.003
	10 15	0024	16.6	7.2		273	8.50	193	0.020K	0.600	0.030	0.004
	10 15	0037	16.4	7.0		269	8.20	197	0.020K	0.500	0.160	0.002
	10 15	0050	13.2	4.4		253	8.20	198	0.020K	0.400	0.230	0.007
	10 15	0085	11.7	4.0		239	8.20	198	0.020K	0.600	0.240	0.004
	10 15	0120	11.6	3.8		250	8.25	202	0.020K	0.600	0.240	0.003

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/05/13	14 20	0000	0.014	2.1	
	14 20	0005	0.012		
	14 20	0015	0.012		
	14 20	0040	0.012		
	14 20	0065	0.011		
	14 20	0094	0.013		
75/08/12	12 00	0000	0.013	4.4	
	12 00	0005	0.015		
	12 00	0015	0.011		
	12 00	0030	0.012		
	12 00	0060	0.025		
	12 00	0121	0.037		
75/09/24	10 15	0000	0.009	1.6	
	10 15	0005	0.010		
	10 15	0024	0.009		
	10 15	0037	0.009		
	10 15	0050	0.010		
	10 15	0085	0.015		
	10 15	0120	0.018		

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STORET RETRIEVAL DATE 76/08/12

490802
39 18 30.0 111 16 48.0 3
JOE'S VALLEY RESERVOIR
49015 UTAH
110691

11EPALES 2111202
0032 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/05/13	14 55	0000	25.4	9.4	72	270	8.50	201	0.020	0.300	0.020	0.014
	14 55	0005	10.3	9.4		270	8.50	202	0.020K	0.200	0.020K	0.011
	14 55	0015	10.4	9.4		259	8.55	202	0.020	0.200	0.020	0.011
	14 55	0028	13.4	9.6		254	8.55	201	0.020K	0.200K	0.020	0.011
75/08/12	12 30	0000	18.3	8.2	96	340	8.50	181	0.020K	0.500	0.220	0.005
	12 30	0005	18.7	8.0		338	8.50	179	0.020K	0.400	0.020K	0.005
	12 30	0020	19.0	8.2		338	8.50	180	0.020K	0.400	0.020K	0.003
	12 30	0030	15.4	6.8		347	8.30	193	0.050	0.300	0.120	0.003
	12 30	0041	10.7	7.2		295	8.15	195	0.040	0.200	0.150	0.002
75/09/24	10 40	0000	17.0	8.2	120	280	8.50	193	0.020K	0.400	0.200	0.002
	10 40	0005	16.9	7.8		281	8.60	194	0.020K	0.700	0.020K	0.002K
	10 40	0024	16.7	7.8		278	8.50	193	0.020K	1.000	0.020K	0.004
	10 40	0040	15.1	6.8		274	8.40	201	0.020K	0.800	0.100	0.003

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/05/13	14 55	0000	0.015	2.0	
	14 55	0005	0.012		
	14 55	0015	0.012		
	14 55	0028	0.013		
75/08/12	12 30	0000	0.011	3.2	
	12 30	0005	0.010		
	12 30	0020	0.011		
	12 30	0030	0.016		
	12 30	0041	0.019		
75/09/24	10 40	0000	0.007	1.6	
	10 40	0005	0.007		
	10 40	0024	0.010		
	10 40	0040	0.008		

K VALUE KNOWN TO BE
LESS THAN INDICATED

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APPENDIX E

TRIBUTARY AND WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 76/08/12

4908A1
39 17 10.0 111 16 10.0 4
COTTONWOOD CREEK
49 7.5 JOES VLY RES
O/JOES VALLEY RESERVOIR 110691
BNK .1 MI DWNSTRM FROM JOES VALLEY DAM
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/11/09	13	30	0.032	0.200	0.025	0.010	0.010
75/02/08	12	15	0.250	0.600	0.032	0.008K	0.010K
75/03/08	12	40	0.071	0.875	0.056	0.005K	0.015
75/04/05	11	00	0.085	0.100	0.025	0.005K	0.030
75/05/03	13	15	0.070	0.800	0.060	0.005K	0.020
75/05/17	12	45	0.025	2.100	0.020	0.005K	0.090
75/06/08	10	30	0.560	1.880	0.037	0.010	
75/07/01	16	50	0.150	0.150	0.005K	0.010	0.010
75/08/16	11	00	0.310	0.350	0.020	0.005K	0.030
75/09/27	11	30	1.000	0.200	0.005K	0.005	0.020

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/08/12

490801
39 19 20.0 111 16 36.0 4
LOWRY CREEK
49 7.5 JOES VLY RES
T/JOES VALLEY RESERVOIR 110691
HWY 29 BRDG 2.5 MI N OF JOES VALLEY DAM
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/11/09	14 00		0.096	0.300	0.015	0.005	0.010K
74/12/18	13 30		0.136	0.500	0.010	0.005K	0.010K
75/02/08	02 45		0.045	0.200	0.032	0.008K	0.010K
75/03/08	11 30		0.080	1.050	0.016	0.008K	0.010K
75/04/05	11 15		0.065	0.550	0.010	0.005K	0.020
75/05/03	13 05		0.045	1.100	0.025	0.005K	0.020
75/05/17	13 00		0.165	0.700	0.015	0.005K	0.060
75/06/08	11 05		0.220	0.550	0.035	0.010	0.060
75/07/01	17 10		0.075	0.500	0.005K		0.140
75/08/16	10 00		0.060	0.350	0.090	0.005K	0.010
75/09/27	10 45		0.050	0.300	0.045	0.005K	0.010K

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/08/12

4908C1
39 18 15.0 111 17 25.0 4
LITTLES CREEK
49 7.5 JOES VLY RES
T/JOES VALLEY RESERVOIR 110691
HWY 29 BRDG .6 M NE OF ORG OLSEN AD SITE
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/11/09	14	20	0.088	0.400	0.020	0.005	0.010K
75/05/17	13	10	0.480	1.400	0.010	0.005	0.160
75/06/08	11	10	0.510	0.700	0.030	0.010	0.280
75/07/01	17	25	0.095	0.600	0.025	0.010	0.160
75/09/27	10	55	0.010	0.100K	0.005K	0.005K	0.010K

K VALUE KNOWN TO BE
LESS THAN INDICATED

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STORET RETRIEVAL DATE 75/08/12

490801
39 17 37.0 111 17 42.0 4
SEELY CREEK
49 7.5 JOES VLY RES
T/JOES VALLEY RESERVOIR 110691
SEC RD BRDG .6 MI W OF SEELY CRK BT RAMP
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/11/09	14	40	0.224	0.300	0.040	0.005K	0.010
74/12/18	14	00	0.248	4.800	0.035	0.005K	0.020
75/02/08	13	15	0.200	1.000	0.024	0.008K	0.010
75/03/08	12	00	0.172	0.350	0.024	0.008K	0.010
75/04/05	11	30	0.170	0.050K	0.010	0.005K	0.040
75/05/03	12	45	0.170	1.130	0.240	0.005K	0.060
75/05/17	13	20	0.450		0.015	0.005	
75/06/08	11	25	0.375	0.750	0.045	0.005	
75/07/01	17	30	0.220	0.175	0.015	0.020	0.058
75/08/16	10	15	0.125	0.550	0.080	0.005K	0.020
75/09/27	11	05	0.115	0.200	0.045	0.005K	0.010K

K VALUE KNOWN TO BE
LESS THAN INDICATED

30

STORET RETRIEVAL DATE 76/08/12

4908E1
39 15 47.0 111 17 00.0 4
SWANSEY CREEK
49 7.5 JOES VLY RES
T/JOES VALLEY RESERVOIR 110691
SEC RD BRDG 1.5 M SE OF SEELY CRK CMPGRD
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/11/09	14 50		0.320	0.500	0.015	0.005	0.360
75/03/08	12 10		0.196	1.150	0.024	0.032	0.280
75/04/05	11 45		0.185	2.000	0.045	0.010	
75/05/17	13 30		0.195		0.020	0.005K	0.300
75/06/08	11 40		0.015	2.700	0.035	0.015	
75/07/01	17 45		0.300	0.350	0.115	0.210	0.293
75/08/16	10 25		0.185	0.300	0.045	0.005K	0.130
75/09/27	11 10		0.110	0.250	0.005K	0.005K	0.020

K VALUE KNOWN TO BE
LESS THAN INDICATED

1325

STORET RETRIEVAL DATE 76/08/12

4908F1
39 16 35.0 111 16 45.0 4
NORTH DRAGON CREEK
49 7.5 JOES VLY RES
T/JOES VALLEY RESERVOIR 110691
BNK 2.6 MI SE OF SEELY CREEK CAMPGROUND
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
75/03/08	12	20	0.264	2.000	0.024	0.093	0.750
75/04/05	11	35	0.430	3.500	0.025	0.210	
75/05/17	13	45	0.015	1.750	0.005K	0.005	0.300
75/06/08	10	55	0.065	0.950	0.030	0.010	0.020
75/07/01	17	50	0.030	0.300	0.090		0.020

K VALUE KNOWN TO BE
LESS THAN INDICATED

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